MALPOSITIONS

OF THE

URETERS.

BY

W. H. BAKER, M. D.,

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In searching our different anatomical works I have been surprised to see how few refer to abnormalities of the ureters in any way except to mention the fact that cases of double ureters are sometimes met with, and I have failed to find in any such book a description of malpositions of the ureters where the bladder was present, and in any other than a rudimentary condition, except in one the fact is noted that the ureters sometimes terminate in a *cul-de-sac*. Thus in "Mickel's Anatomy," Volume III., page 385, we find: "The congenital anomalies of the ureters are: first, their absence; second, their imperforations in one or several points, from an obstacle; third, their plurality."

Again, in "Andral's Anatomy," Volume II., page 394, under head of Diseases of the Urinary Apparatus, this: "We sometimes observe cases of malformation of the ureters. Thus, they have been found united by a transverse duct. Again, two ureters may pass from the same kidney, and either open separately into the bladder, or unite before entering it. The latter is generally the case. When the bladder is wanting, or exists only in a rudimentary state, the ureters terminate in some other part. Thus, they have been known in such cases to open: 1, into the umbilicus; 2, the rectum; 3, the vagina; 4, the urethra; and nearly the same facts are mentioned in the *Dublin Dissector*. "Cruveilhier's Anatomy," Volume I., refers to the subject in the following terms: "The ureter

is generally single on each side, but sometimes double, and that under very different circumstances; for example, when the two kidneys are united into one, a double ureter is almost invariably found; and secondly, when, there being two kidneys, one of them is divided into very distinct portions. In the latter case, the two ureters are often united into one, after a course of a few inches.

In this field of anatomical knowledge, where comparatively so little has been published, the report of cases which shall add to the scanty literature of this subject becomes both interesting and instructive. It is with this object in view that the following case is presented.

May 25, 1876, by the kindness of Dr. H. J. Bigelow, I was asked to see Miss C——, who complained of frequent micturition unaccompanied by pain. She had twice been examined under ether, an acute anteflexion of the body of the uterus diagnosticated, and a pessary adjusted. The urine had been analyzed, but failed to show anything abnormal or irritating in its composition.

The pessary being removed, the position of anteflexion was verified by the passage of the uterine probe, which also showed the presence of a slight endometritis. There being some vaginal irritation, it was deemed advisable to discontinue the use of any mechanical appliance for a time, and substitute the vaginal injections of hot water twice a day. The patient was away through the summer, but returned to the city for treatment in November. On obtaining a more careful history of the case, it was found that the patient was twenty-two years of age, and had always lived in Massachusetts, was highly educated and accomplished, that the family history was very good, and that she had never had any severe sickness. Her general health was excellent, and she complained of nothing but the very frequent micturition, which had annoyed her for several years, though no exact data could be given, and had increased very much within two years. The malposition of the uterus gave rise to absolutely no symptoms except the vesical intolerance. The menstruation was perfectly regular and normal.

For the next two months attempts were made with various pessaries to lift the body of the uterus off the bladder, but Grailly Hewitt's, Thomas's, and others all failed, inasmuch as the portion of the instrument which raised the anterior vaginal wall against the body of the uterus seemed to occasion as much vesical irritation as the body of the uterus itself.

A pessary was finally devised consisting of a stem which locked into a modification of a Hodge, which corrected the anteflexion very satisfactorily. It was worn with comfort, and could be removed at pleasure by the patient. But after being used for some time it was found that, although the uterus was in perfect position, yet the vesical symptoms were still present, and as annoying as ever, so that we were now convinced that some other cause than the malposition of the uterus must be sought, to account for the great inconvenience from which the patient suffered. The urine was again analyzed with a negative result, and a careful exploration of the bladder made with a like unsatisfactory effect.

The history of the case was again reviewed, this time with all the additional light which the mother could give. This revealed the fact that, every few minutes feeling a slight involuntary flow of urine, the desire was at once felt to relieve the bladder, although, if so situated that it could not be gratified, she was able to control the sensation for an hour or an hour and a half, being subjected all the while to the constant dribbling of the urine, which kept her clothes continually wet. The mother now remembered that when the patient was a child her clothes were constantly wet, and an aunt, who had the charge of her for five years when the mother was absent, gave a similar account, adding that she thought it "merely a weakness which she would outgrow." In making another examination to see if there was any want of tone in the neck of the bladder to account for the incontinence, a drop of urine was seen to well up from a minute hole, two lines below and to the left of the lower angle of the meatus urinarius. A lachrymal probe was the largest that would pass through this orifice, but once through the external opening the canal seemed to be spacious enough, and conducted the probe two and a half inches in the vesico-vaginal septum, to the left *cul de-sac*, but with a sound in the bladder failed to find any established communication with that viscus.

January 26, 1877.—Dr. Bigelow saw the patient with me in consultation, but failed to find any fistulous opening into the bladder, or to pass the probe beyond the two and a half inches.

February 15th.—The bladder was filled with milk and water, but none of it returned through the newly-found channel; on the contrary, there was constantly being discharged, drop by drop, clear urine. About a fluid drachm of it was thus collected in a test-tube, while the bladder was distended with the milk and water, which was submitted to Dr. E. G. Cutler for analysis, and proved to be urine by the formation

of nitrate of urea crystals. The length of the urethra was carefully taken, and found to be one inch and a half. We had evidently direct communication with a ureter (probably the left), and, from the fact of our inability to probe more than two and a half inches, concluded that we had to deal with a fistula from the ureter, which might have occurred as the result of an abscess in early life, although we could obtain no history of any symptom which would tend to substantiate such a theory.

May 17th.—The patient was etherized; and, assisted by Drs. Bush and Tuttle, I proceeded to close the supposed fistula. With a probe in this canal, a Sims speculum exposing the vagina, an incision was made through the vaginal membrane down upon the probe, one inch and a half from the meatus, and it was then found that, instead of cutting into a fistulous tract, we had opened a ureter, from which the urine now flowed drop by drop as it had from the minute orifice by the side of the meatus. A uterine probe could now be passed seven inches, which was the length of the instrument, up the course of the left ureter. From the point of incision this ureter was now easily dissected out, which was done for a little more than an inch inward and a portion of the way outward. It was then decided to turn the course of this ureter into the bladder as near the point where it should have gone as possible. Dissecting up the vaginal membrane to the left of the median line at a point one inch from the internal orifice of the urethra, the bladder was punctured, the ureter was then cut off, enough being left to go through the thickness of the bladder, that the tension might not be too great upon the ureter. The edge of the ureter was then stitched to the lining membrane of the bladder all around the incision through that viscus; the stitches used (being the only ones at hand) were strong cotton threads, which were cut off short and left to ulcerate into the bladder. The vaginal wound was then closed over the whole, the edges of its membrane being brought together by five silver sutures. A uterine probe then being passed through the urethra into the bladder, could be conducted several inches up the ureter. The clots being then washed out of the bladder, the patient was put to bed.

It is useless to prolong this history by a detail of the after-treatment, which consisted in keeping the bladder washed out two or three times a day, and the vagina morning and evening. The urine was drawn every four hours for several days, then every six hours, until the eighth day after the operation, when the silver sutures being removed, the line of union being perfect, she was allowed to pass the urine naturally. From

May 22d to May 29th, four of the short cotton stitches, coated with phosphatic deposit, were noticed in the water returned from the bladder, and it was judged that the two remaining had passed unobserved. She did not present an unfavorable symptom from the time of the operation, and was allowed to be up and about the room in two weeks, leaving the city for her home four days later, with instructions to return for an examination in about a month.

July 19th.—The patient reported entire relief from the incontinence of the urine, and the desire for micturition was felt only at intervals of five or six hours, the anteflexed body of the uterus, undoubtedly, having some effect to frequent this desire beyond the normal. On making the most careful examination, no moisture was discovered either at the old opening of the ureter, near the meatus, or at the point where the ureter was cut into through the vagina. I was unable, however, to pass the uterine probe through the urethra into the newly-formed orifice of the ureter, as had been done after the operation, while the patient was under ether, the reason of which may have been the diminished facility which the patient presented to the use of the probe without ether, or may have been from the contraction of the wound in the bladder to which the ureter was stitched.

Two points in the history of this case deserve especial notice:

1. The fact that before the operation, both Dr. Bigelow and myself were unable to pass the probe into the ureter more than two and a half inches; whereas, as soon as the ureter was cut into at a point one inch and a half from its natural outlet, or one inch below the point of obstruction, the much larger uterine probe passed readily several inches beyond, with no apparent obstruction at all. This may have been due to some muscular rigidity which was relieved by the anæsthetic, or with equal probability may have been due to a more intimate attachment of the ureter to the bladder at that point, which, it will be remembered, was near the site where the ureter should have naturally entered the bladder, the ureter being opened through the vagina; and, a large uterine probe being then admitted into its orifice, the instrument was brought against the point of previous obstruction much more directly, and more completely filled the ureter, overcoming any folds of its lining membrane which may have

interfered with the passage of the more delicate probe, which alone would pass its natural orifice.

2. The fact that not one-half the quantity of urine secreted was discharged by this left ureter. There was apparently no diminution in the amount of urine voided from the bladder, yet that discharged from this ureter was only sufficient to saturate two or three napkins a day, or keep her clothes constantly wet. This may have been due to (*a*) a small kidney on the left side, the right kidney doing the greater part of the work; (*b*) a supernumerary kidney on the left side, its ureter discharging beside the meatus urinarius; (*c*) a double ureter on the left side, one half of which opened normally into the bladder, the other opening beside the meatus urinarius.

In this connection, it may be interesting to look a little into the early development of the ureters and kidneys, and see, if possible, how some of these abnormalities occur.

According to Kupffer,[1] and as confirmed by a number of other observers, including Waldeyer, in the lowest class, or amphibia, the Wolffian body directly bears the hollow bud which gives the foundation of the permanent kidney, while in the upper classes the duct from the Wolffian body gives rise to a second or renal canal, from which the budding formation takes place. This quite agrees with Foster and Balfour[2] in their observations on the chick, the result of which was that, between the eightieth and one hundredth hour of incubation, the permanent kidneys begin to make their appearance, the first portion of them to appear being their duct. Near its posterior extremity the Wolffian duct became expanded, and from the expanded portion a diverticulum was constricted off, which was the duct of the permanent kidney, or ureter. The ureter and Wolffian duct, which at first opened by a common trunk into the cloaca, by the sixth day had independent openings. From the upper end of the ureter, diverticula were given off at right angles into the intermediate cell-mass. These lengthening, and becoming twisted, formed the tubuli uriniferi, while the mesoblast around their extremities became di-

[1] *Archiv für mikroskopische Anatomie.* Bonn, 1866. Vol. ii., p. 473.
[2] "Elements of Embryology," p. 163.

rectly converted into the Malpighian bodies and the capillary network of the kidneys. The formation of the kidneys took place before the end of the seventh day.

The kidney thus formed is finally made up of a greater or less number of distinct lobes, or of a single mass without external divisions. Thus, H. Milne-Edwards[1] has shown that in man, near the tenth week of intra-uterine life, about eight renal lobes on each side are counted, the number of these lobes afterward increasing, then decreasing; at the period of birth, however, about fifteen are still to be counted. The formation of the bladder is quite different in not being a subsequent production, but the remains of the allantois, which, according to Kupffer, loses its spherical form as soon as it opens externally by the formation of a short urethra.

It is not difficult to see from the foregoing how cases of double ureters occur, for, when the upper portion of the ureter divides to form the calices of the kidneys, it is only necessary for these diverticula to be given off at a lower portion of the ureter, or even for this folding-in process to extend throughout its whole length instead of being confined to its upper extremity. It is possible that the arrangement of the vessels at this early period may so interfere with the proper development that this divided upper portion of the ureter becomes lengthened.

Having glanced thus hastily at some points on the development of the urinary organs, as well as referred to some of their abnormalities, I wish to present some cases which I have found variously recorded, or with which I have been kindly furnished by individual surgeons, in which the ureters have been in some respects abnormal. It may aid us somewhat in seeing how this case, which we have reported, should have occurred, by a systematic arrangement of the following cases.

Absence of one or both Kidneys with their Ureters. —The fact that Dr. Beumer has collected the records of forty-eight cases, recently published in Virchow's *Archives*, in which one kidney, and in nearly all the corresponding ureter, was absent, and that this number of cases occurred within

[1] "Leçons sur la Physiologie et l'Anatomie Comparée," tome vii., p. 311.

twenty-five years, show that this abnormality is not so extremely infrequent, and we only give two cases where, either from the peculiar position of the kidney or from the detailed account of the arrangement of the vessels, they are of especial interest. But we must believe that the following case, given by Rayer, where both kidneys and ureters were absent, must be unexceptionally infrequent. In his work on "Diseases of the Kidneys," 1841, he thus refers to this subject:

"The total absence of kidneys has been several times noticed in the fœtus, occasionally in the infant at birth; and one case is recorded of such absence in a young girl aged fourteen, who died of chronic enteritis. Among other malformations, there were neither ureters nor kidneys to be found; but the calibre of the umbilical vein greatly exceeded that usual in adults. The girl had, from her birth, been subject to an inconvenience of a very troublesome character—there flowed continually from the umbilicus a fluid closely resembling urine, and emitting so strong a smell that it was impossible to change the linen covering the part sufficiently often. The bladder was wanting."

Dr. Bouillaud refers to a subject which he met, where there was but one kidney, situated across the spine, furnished with two ureters. Unfortunately the terminus of the ureters was not given.—*Journal Complémentaire*, July, 1828, quoted in *American Journal of Medical Sciences*, vol. iii., p. 441.

Dr. E. G. Cutler presented to the Boston Society for Medical Improvement, April 22, 1878, the specimen of an absent kidney and ureter on the left side. The subject, a man with ulcer of the duodenum of eight years' duration, died of hæmatemesis, no symptoms referring to the kidney being present. At the autopsy the left spermatic vein, of normal size, entered at right angles into the left supra-renal vein which emptied into the vena cava. There was no left renal artery. Two small arteries ran to the left supra-renal body, of the size of knitting needles. The right kidney not enlarged, with normal vessels, and ureter weighed six ounces. There was no appearance of any opening in the bladder where the left ureter should have terminated, nor any trigone vesicale. The right and left supra-renal bodies were normal.

Ureters opening elsewhere than into the Bladder.—Mr. Fletcher Beach presented to the Pathological Society of London the case of a child, five years old, healthy until six weeks previous, when there was difficulty of micturition, which increased, and death ensued. At the *post mortem*, a

third ureter, filled with pus, was discovered, opening below into a pouch near the bladder.—*British Medical Journal*, 1874, vol. i., p. 649.

Dr. T. A. Emmet has kindly furnished me the statement of a case upon which he operated in the Woman's Hospital of New York. The patient was twenty years of age and unmarried; one of the ureters discharged into the upper part of the vagina beside the cervix uteri. His operations were to form a canal, or ureter, out of the anterior vaginal wall by folding it over and thus lengthening out the naturally too short ureter, until it should be brought down nearly to where it should have entered the bladder, at which point he would perforate that viscus, thus turning the urine into its normal receptacle, instead of dribbling into the vagina. Unfortunately the patient left the hospital and was lost sight of before the final operation was performed.

Dr. C. Davis presented to the Museum the case of an acephalous fœtus. The kidneys were converted into large, membranous sacs, no trace of granular structure being recognizable. The ureters, particularly the right one, were remarkably dilated and elongated; they formed two great tortuous tubes, resembling pieces of large intestines as to size, and presented in several situations very close constrictions, and in others complete obliterations. The right tube had no communication with the bladder. The latter organ was much enlarged and misshapen. No urethral obstruction was present.—*Catalogue, Museum, R. C. Surgeons, Ireland.* "Pathology," vol. ii., p. 434.

Double Ureters which coalesce in some Part of their Course.—That it is much more common for double ureters to become united before reaching the bladder, we are all well aware, and that such cases are not extremely infrequent we are sure, yet on account of the non-publishment of many of this class we are unable to give the comparative frequency in the occurrence of this with the next class. We record a few cases, showing the different distances from the kidney where the union has been noticed to occur:

Dr. Bouilland refers to a subject which he met, where two ureters proceeded from the right kidney, and at the termination of about two inches united in one canal. The left kidney was natural.—*Journal Complémentaire*, July, 1828, quoted in *American Journal of Medical Science*, vol. iii., p. 441.

Mr. Henry Thompson showed the specimen to the Pathological Society of London. The patient, ninety-six years of age, had died, as the result of an accident. The ureter (not

stated which) was double for a length of about two inches, and the chambers of the pelvis did not communicate. The organ was not diseased.—*Medical Times and Gazette*, 1855, vol. i., p. 375.

Richard Dowling, Esq., reported a case which occurred in the Hôpital des Veneriens. On the left side the ureter arose double, becoming coalesced, however, about two and a half inches from the kidney, from which point it continued on in one canal, emptying into the bladder by one orifice.—*London Lancet*, 1832, vol. i., p. 733.

Dr. Walter Smith refers to a case which was exhibited to the Pathological Society of London, where there was a double ureter, the union of the two tubes taking place at a distance of about four and a half inches from the kidney.—*Dublin Journal of Medical Sciences*, vol. lvii., p. 384. *Report of the Dublin Pathological Society.*

Dr. Carl Wiegert reports a case where the left kidney gave off two ureters which united together at an acute angle after a separate course of about fifteen centimetres, and opened into the bladder in the usual place. Each ureter corresponded to a pelvis of the kidney, so that there was an upper and a lower one. The two pelves were separated by a thick layer of kidney, yet so that one could not remark the boundary of the two territories of pelvis from the outside. The diameter of the ureters, when slit up, averaged one centimetre in the ununited as well as in the united portions.—*Virchow's Archives für pathologische Anatomie und Physiologie, und für klinische Medicin*, lxx., Heft iv., p. 490.

We are very sorry that the reports of many cases of double ureters which we have found, which might have been of the greatest interest in this connection, as possibly helping to establish the comparative frequency of this with the next class, failed to state anything as to their termination, and are therefore worthless here.

Double Ureters which retain their Distinctness throughout their whole Course.—Case [1] reported by Richard Dowling, Esq., which occurred in the Hôpital des Veneriens. The patient entered the hospital for syphilitic disease; and, dying, at the autopsy there were found on the right side two distinct ureters, one arising from the superior, the other from the inferior, portion of the kidney. The two canals were perfectly

[1] *See* case under previous class for left kidney and ureters, from same subject.

separate throughout the whole of their extent, but were united by cellular tissue, so as to form, in appearance, a single one, at about two inches from the bladder, into which they opened by two distinct orifices placed side by side at the usual point in the right superior angle of the organ.—*London Lancet*, 1832, vol. i., p. 733.

Dr. Walter Smith exhibited a kidney possessing a double ureter which had been taken from a body in the dissecting-room of Trinity College. The point of interest in the case was that the duct was double throughout the whole extent, from the kidney to the bladder. It was the right kidney which presented this abnormality, that on the left side being normal. At first, it seemed as if the two tubes were joined together at some distance from the bladder; but, by careful scraping, the two ducts could be separated down to their entrance into the bladder. The occurrence of a double ureter was sufficiently rare to make the case worth exhibiting.—*Dublin Journal of Medical Science*, vol. lxvii., p. 384; *Report of the Dublin Pathological Society.*

Prof. Barbosa observed the following anomaly in a body brought to the Lisbon Medical School: Two distinct ureters existing on the left side, entering the bladder by two distinct orifices. The left kidney was longer by three centimetres than the right, and the two ureters at their origin in the fissure were each provided with a separate pelvis, the united capacities of which only equaled that which would be required by a kidney of this size. The two canals, separated from each other by about three centimetres at their origin, pursued their normal course, one before the other. At about five centimetres from the bladder, they united into a single cord, which traversed its muscular tunic. Careful dissection, however, showed this to be only apparently so, each opening into the bladder distinctly about one or two millimetres from the other. During the last two centimetres of their course, the contiguous walls of the two tubes were so blended together as to constitute but one.—*Gazeta Medica de Lisbon*, 1860, No. 7, and quoted in the *Medical Times and Gazette*, 1860, vol. ii., p. 39.

Dr. Harrison Allen narrated the *post mortem* appearances of a malformation of the kidney, occurring in a case which he had recently observed. The peculiarity consisted in an elongation of the organ, and its being furnished with two ureters which took their origin from the upper and lower portion of the hilum, at a distance of about one inch apart, and, gradually converging, entered the bladder within about one-eighth of an inch of each other.—*Philadelphia Medical Times*, vol. iv., 1874, p. 220; *Proceedings of the Academy of Natural Sciences.*

Dr. Carl Wiegert reports a case where the right kidney had a bladder with a flaccid but thick wall on its upper part, the rest of it quite resembling the tissue of the other kidney,[1] having a pelvis of ordinary dimensions. From the upper broad cavity in immediate connection with its wall, there went a very broad ureter, and from the lower pelvis of the kidney, a narrow one. The diameter of the first was five centimetres; of the second, one centimetre. The first ran from one and a half to one centimetre distant from the narrow one, and on its inner side; but gradually got behind it, when the narrow one went obliquely before it. In a full condition, it resembled a distended intestine with very shallow curves. In the small pelvis there were several larger curves. This broad canal did not open in the usual place, but went between the posterior wall of the bladder and the left seminal vesicle (before the latter) deep in, became narrowed in a funnel-shaped manner, and sunk into the prostate from above downward, and finally opened by a slit-like opening, large enough to admit a fine probe, into the urethra at the bladder end of the caput gallinaginis. One-half centimetre below, the ductus ejaculatorii opened, and between them the vesicula prostatica. There was no abnormality in this, and it formed no connection with the ureter. The other ureter was closely connected to the front wall of the large ureter in the small pelvis, but left it to open into the bladder in the usual place. From the aorta on each side one renal artery sprang, which separated into several branches before it entered the hilus. There was a corresponding course of the veins. The hilus, moreover, was in the usual position. — *Virchow's Archives für pathologische Anatomie und Physiologie und für klinische Medicin*, lxx., Heft iv., p. 490.

We have thought it inadvisable to refer to the cases we have found reported, where, the ureter being opened as a result of external violence, stabs, bruises, etc., the urine has been discharged through external wounds; but we cannot refrain from quoting the very interesting case of Nussbaum's, where this result was most ingeniously overcome.

After an operation for ovariotomy on a woman forty-seven years old, when the right ureter had undoubtedly been divided on removing a part of the tumor which had become adherent to it, Nussbaum dilated the sinus remaining after the operation, and passed the finger into a cavity, of the size of a pig-

[1] For description of left kidney and ureters, *see* previous class by same observer.

con's egg, to the right of the uterus, which was filled with urine, and into which the right ureter opened. A cure was effected in the following way: The urethra was rapidly dilated, and the finger introduced into the bladder; but, as the entrance of the right ureter could not be detected, a trocar was passed through the wall of the bladder into the small cavity mentioned above, and this track was kept open by means of drainage-tubes. The drainage-tube constantly worked out of the canal which had been made for it, still, the passage remained patent, while the fistula in the abdominal walls closed after an application of the cautery, and a complete cure was the result.—*Centralblatt für Chirurgie*, No. 37, from the *Baerisches Aertzl. Intell. Blatt.* 1876, No. 7, p. 63.

It will be seen, by the foregoing cases, that the report of none was found where the terminus of the ureter was so far removed from its natural position as the one which had come under my observation; and I had begun to consider it as unique, when, by the kindness of Dr. J. B. S. Jackson, who remembered having seen a remarkable case of this class at the Boston City Hospital some years previously, I was referred to the hospital records of that institution, where I found the following case, almost identical with the one already reported.

M. M. entered the Boston City Hospital October 7, 1870. She was fifteen years of age, and had suffered from incontinence of urine since her birth. She had been employed as a domestic for three years previously. Menstruation began only three months before, and was accompanied by some pain in the left side. The incontinence was not complete, for she always retained a part of the urine, which she passed, at regular intervals, two or three times a day.

On examination, the thighs were found reddened from the constant irritation of the urine flowing over them. Four ounces of urine was drawn from the bladder. The patient, being put under the influence of ether, a small opening was discovered one-sixth of an inch to the left of and behind the meatus urinarius, from which issued urine drop by drop, increasing to a slight jet on the patient's coughing. A probe inserted into this opening passed upward and slightly to the left more than an inch, and separated from the anterior wall of the vagina by a very thin wall. No communication, however, could be found with the bladder, vagina, or urethra. Subsequent examinations, made under ether, resulted at times

in being able to pass the largest probe at hand, five inches through this canal, its extremity not then being reached, while at other times all attempts to pass it more than an inch were fruitless. When the probe was passed its greatest distance, it could be distinctly felt, with the finger in the vagina, the whole length of that canal to its left portion, and separated from the finger only by a thin wall.

October 29th.—The patient left the hospital before any treatment had been instituted for her relief.

In this case, the opening of the ureter was almost identical with the one at the beginning of this article, and the course of the ureter was likewise to the left side. The same difficulty arose in both cases in introducing the probe more than a very short distance, except when the ureter was drawn upon, or from the relaxation of the muscular action, the peculiar constriction was overcome, allowing the probe to go several inches up the course of the ureter. In this case, however, unlike the other, there was a large amount of urine discharged by this abnormal canal.

It is greatly to be regretted that this case was lost sight of, and that all efforts to obtain a knowledge of her whereabouts have been unavailing.

From the preceding cases and notes the following facts may be noted:

1. The ureter may naturally be so misplaced as to give rise to the most troublesome symptoms, foremost of which stands incontinence of urine.

2. In cases where the ureter is so misplaced, it is possible to overcome the difficulty by surgical interference.

3. It is not absolutely essential to the life of an individual, that either kidneys, ureters, or bladder exist, as shown by the case of Rayer reported.

4. Contrary to the opinion of most writers, and substantiated by the forty-eight cases reported by Brumer, where one kidney is absent the remaining one is not always enlarged, as shown by the case of Dr. Cutler reported.

5. Where the ureters arise double, they are usually given off, one from the upper, the other from the lower part of the kidney, the pelves being distinct and separated by the proper structure of the kidney.

6. Where a ureter terminates in some other part than the bladder, that viscus may be present and well developed, notwithstanding most authorities state the contrary.

7. In most of the foregoing cases the malformations of the ureters were unaccompanied by any troublesome symptoms, and the interesting defects were only discovered at the autopsy.

8. In three of the preceding cases the malformation was discovered during life, having given rise to incontinence of urine by the ureter discharging either by the side of the meatus or into the vagina.

Having written the foregoing article, I was about sending it to press in the early part of the spring of the present year, when I was consulted again in regard to Miss C., whose case is the subject of the paper. I found that, in the fall of 1877, she had begun to complain of some pain in passing water, while there appeared some blood and pus in the urine, and later, difficulty in moving about much, on account of the great pain in the bladder which it occasioned. There was no incontinence, but frequent desire to urinate. During the whole of this time she had been under the care of an irregular practitioner, who had treated her for "liver complaint." She came to the city, where, under ether, by the assistance of Drs. Cutler and Flanders, I removed from the bladder, through an incision in the vagina, a phosphatic calculus which weighed 264 grains.

I did not allow the artificial fistula to close then, as I preferred to have the interior of the bladder become perfectly healthy before allowing any urine to accumulate there. The success of the first operation on the ureter was in no way affected by this later coincidence.

In looking up the literature of this subject, particularly in reference to the development of the ureters, I am greatly indebted to Drs. J. C. Dalton and Dr. Thomas Dwight; and to Dr. E. G. Cutler for his assistance in reviewing the general writings on this topic.